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ECONOMIC BENEFITS OF ERADICATING TUBERCULOSIS FROM LIVESTOCK

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PUBLIC INTEREST IN THE ERADICATION CAMPAIGN

The systematic campaign, begun in 1917, to eradicate tuberculosis from livestock in the United States has resulted in extensive, and often spirited, discussions of many features of this work. With the testing of cattle now proceeding at the rate of approximately a million animals monthly, wide public interest and comment are naturally to be expected. Much of the discussion has related to the menace of bovine tuberculosis to the human population. This subject has a strong popular appeal, and without doubt the human-health factor has been responsible for much of the support given to the campaign.

Meanwhile there have been accumulating, also, striking results dealing with the economic or business side of this great endeavor. Records of tuberculin testing, supplemented by slaughter data, form a substantial basis for judging the results from a commercial standpoint. The results have a bearing on such practical matters as livestock values, salability of surplus stock, establishment of new industries that utilize livestock and dairy products, greater diversification of agriculture, and similar developments. Such information is useful, also, in judging the benefits to be expected when similar work is undertaken in new areas.

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[1] Acknowledgment is made of the valued assistance of public officials and members of the livestock, dairy, and poultry industries, who furnished material used in this publication.

Thus far the campaign has been directed chiefly against tuberculosis of cattle, which accounts for the relative prominence of data on that class of animals. Livestock owners and the public should keep in mind, however, that tuberculosis affects swine and poultry also to a great extent and may occasionally affect other animals.

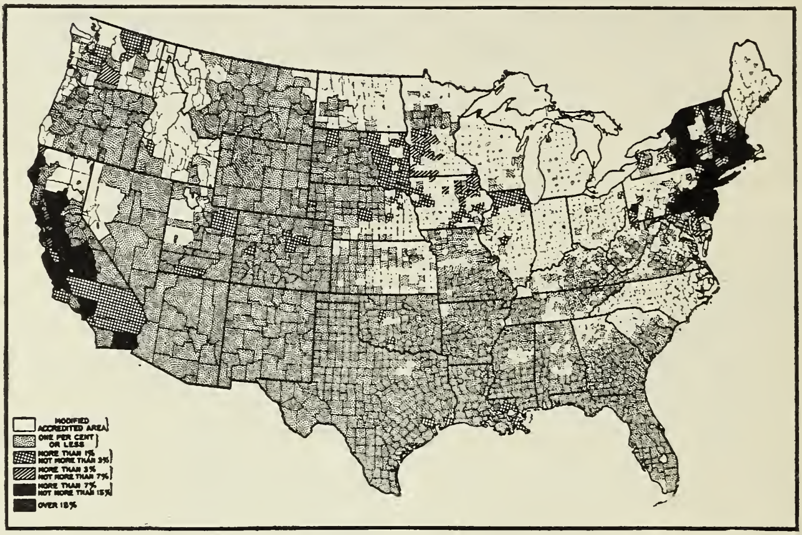
MODIFIED ACCREDITED AREA
ONE PER CENT OR LESS
MORE THAN 1% NOT MORE THAN 3%
MORE THAN 3% NOT MORE THAN 7%
MORE THAN 7% NOT MORE THAN 15%
OVER 15%

FIGURE 1.—Extent of bovine tuberculosis in the United States. Shaded portions revised to May 1, 1928; white areas, representing modified accredited counties, revised to July 1, 1931

OFFICIAL DATA RELATING TO ECONOMIC FEATURES

MORBIDITY OF BOVINE TUBERCULOSIS

From a business standpoint the prevalence of bovine tuberculosis has far-reaching effects not only on agriculture but likewise on many commercial enterprises, especially the meat and dairy industries. Unlike many other diseases, tuberculosis does not, in time, create an immunity, but if unchecked by energetic control or eradication measures continues to spread steadily. The rate of its spread is about in proportion to the opportunities, being greatest where there is free movement of tuberculous livestock. When the systematic cooperative campaign against tuberculosis was undertaken, some intensive dairy districts contained more than 25 per cent of tuberculous cattle, and the average for the entire country exceeded 4 per cent. By 1931 the prevalence had been reduced to approximately 1.7 per cent. Figure 1 shows the general distribution of bovine tuberculosis in the United States.

That steps for eradication were taken none too soon is evident from the experience of several European countries where the disease has assumed large proportions, making the task of eradication highly formidable. In the United States the small average degree of infection makes eradication feasible and relatively economical, as events of the last 14 years have fully demonstrated. From the standpoint of both private and public business, true economy consists in aggressive measures to wipe out the disease before it can make further inroads among our livestock.

In discussing the prevalence of tuberculosis in the United States, L. Van Es, Department of Animal Pathology and Hygiene, University of Nebraska, sums up the situation briefly as follows:

> In no sense is it a self-limiting disease; it does not eradicate itself nor recede in the manner of some other animal scourges. If the disease is not an urgent problem to-day, it is bound to become so to-morrow, because if unopposed by restrictive measures it always increases its morbidity rate. The few data available indicate that in a cattle population of more or less constant numbers the tuberculosis rate doubles every 15 years, and when the bovine population is growing the rate of infection dissemination will be even more rapid.

REDUCTION IN PREVALENCE OF THE DISEASE

The task of eradicating bovine tuberculosis, though conducted intermittently before 1917, has made its greatest progress since that date. The work has been marked by a great volume of testing conducted by Federal, State, and county veterinary forces in the various States. Especially during the last few years county officials and county governments have actively supported the project with funds and the employment of veterinarians. The effect of this work on the extent of tuberculosis among cattle can fortunately be measured, with considerable accuracy, by records of the Federal meat-inspection service of the Bureau of Animal Industry.

Since about two-thirds of the total number of animals slaughtered for food in the United States are federally inspected at the time of slaughter, the data collected by the meat-inspection service are comprehensive and serve as a valuable index to the extent of tuberculosis as well as other diseases in American livestock.

In the cooperative plan used in combating bovine tuberculosis, reactors are slaughtered under Federal inspection. The detection of tens of thousands of these tuberculous cattle annually in the early years of the campaign and hundreds of thousands of them annually in recent years naturally has added greatly to the number of tuberculous cattle received in federally inspected establishments. The post-mortem inspection of reactors shows some to be affected only slightly, as, for instance, with lesions of a minor character in visceral glands or organs. If a careful veterinary inspection in such cases reveals no extension of the disease or evidence of progressive activity of the lesions, the diseased organs or parts are condemned and destroyed for food purposes and the remainder of the carcass passed for food in conformity with the principles of scientific meat inspection. Carcasses seriously affected with the disease are condemned and entirely destroyed. Table 1 shows the number and general condition of cattle carcasses, with respect to tuberculosis, inspected during the progress of the campaign.

TABLE 1.—*Results of post-mortem examinations of cattle under Federal meat inspection, showing condemnations for tuberculosis, 1916–1931*

Fiscal year ended June 30—	Cattle slaughtered		Condemnations for tuberculosis					Approximate weight of meat condemned [3]
	Total, including reactors	Reactors slaughtered	All carcasses, including reactors [1]		Carcasses, excluding reactors		Edible parts of all carcasses [2]	
	Number	*Number*	*Number*	*Per cent*	*Number*	*Per cent*	*Number*	*Pounds*
1916	7, 404, 288	17, 239	37, 085	0. 501	31, 159	0. 42	58, 873	19, 999, 000
1917	9, 299, 489	23, 440	46, 351	. 498	40, 746	. 44	68, 872	23, 795, 000
1918	10, 938, 287	25, 870	40, 792	. 373	36, 242	. 33	58, 209	19, 941, 000
1919	11, 241, 991	29, 448	37, 600	. 334	33, 134	. 29	53, 652	18, 268, 000
1920	9, 709, 819	43, 631	37, 492	. 386	30, 695	. 32	54, 670	19, 500, 000
1921	8, 179, 572	41, 590	33, 328	. 407	25, 730	. 31	51, 182	18, 458, 000
1922	7, 871, 457	76, 134	39, 434	. 501	28, 622	. 36	60, 441	21, 444, 000
1923	9, 029, 536	94, 561	49, 839	. 552	34, 774	. 39	67, 199	26, 322, 000
1924	9, 188, 652	139, 310	56, 760	. 618	33, 545	. 36	73, 794	29, 498, 000
1925	9, 773, 883	177, 914	61, 104	. 625	34, 512	. 35	84, 027	31, 675, 000
1926	10, 098, 121	280, 522	70, 604	. 699	35, 691	. 35	101, 757	37, 489, 000
1927	10, 049, 589	238, 792	53, 512	. 532	27, 413	. 27	80, 952	27, 859, 000
1928	9, 040, 028	202, 146	38, 931	. 431	21, 720	. 24	59, 242	20, 271, 000
1929	8, 284, 324	163, 325	31, 254	. 377	17, 539	. 21	43, 935	16, 554, 000
1930	8, 280, 778	161, 018	26, 238	. 317	12, 215	. 15	36, 828	13, 052, 000
1931	8, 515, 203	146, 766	20, 455	. 249	10, 140	. 12	29, 741	10, 192, 000

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[1] Carcasses of many reactors are passed as suitable for food after Federal inspection; hence the figures in this column are not the differences obtained by subtracting the number of reactors slaughtered from the total number of carcasses condemned.

[2] In addition to whole carcasses condemned.

[3] Calculated at average annual weights for carcasses and estimated weights for parts of carcasses.

Table 1 likewise includes the number of reactors slaughtered each year at federally inspected establishments. A study of this table shows the unmistakable influence of the great number of reactors sent to slaughter on the condemnation of carcasses and parts. The greatest number and percentage of condemnations occurred in 1926, when the high record total of 280,522 reactors were slaughtered in addition to the regular kill. The decline in condemnation since 1926 likewise merits consideration. Although the total number of cattle tested has increased steadily since eradication work began, since 1926 there has been a falling off in the number of reactors. This decline is no doubt partly responsible for the smaller number and percentage of cattle carcasses and parts condemned since 1926.

It is noteworthy also that the percentage of condemnations because of tuberculosis was much smaller in 1931 than in 1916, notwithstanding that about nine times as many reactors were slaughtered in 1931 as at the earlier date.

In Table 1 the condemnations of carcasses and parts because of tuberculosis are shown also in terms of meat. The greatest loss of meat occurred in 1926, which corresponds with the year of largest reactor slaughter, previously mentioned. Although the reactor slaughter continued to be large in the following years, the loss of meat in 1931 had declined more than 27,000,000 pounds, or about 75 per cent.

Briefly, the table indicates a trend toward smaller condemnations of cattle carcasses and parts even though thousands of reactors are being slaughtered in addition to the regular kill. A more normal picture of the same situation is seen in the portion of the table which shows condemnations excluding the reactors. The figures in that case refer only to the regular kill of cattle sent to market. The general decline in the percentage of cattle carcasses condemned because of tuberculosis is especially noticeable, being from 0.42 to 0.12 per cent, indicating a reduction in the extent of the disease.

A series of surveys, made biennially, likewise points to a declining prevalence of bovine tuberculosis in the United States. The surveys are based on the results of tuberculin testing and other sources of information, and the detailed data show the situation in each county. Table 2, based on the five surveys, shows that during the eight years from 1922 to 1930 the estimated extent of bovine tuberculosis was reduced from 4 to 1.7 per cent.

TABLE 2.—*Summary of five national surveys showing extent of bovine tuberculosis in United States*[1]

Year	Cattle in United States	Per cent of cattle tuberculous[1]
1922	69, 329, 000	4. 0
1924	66, 487, 000	3. 3
1926	60, 937, 000	2. 8
1928	57, 390, 000	2. 0
1930	57, 390, 000	1. 7

Based on available records of testing and the proportion of reactors to the total, using counties as units.

Thus two entirely different sets of figures—meat-inspection records and official surveys—point to a marked decline in the prevalence of tuberculosis among cattle in the United States in recent years. It is not to be expected that the two sets of figures would show exactly the same decline since animals sent to slaughter are not necessarily representatives of the average infection throughout the country or even in their own localities. Moreover, tuberculin testing is being constantly taken up in some localities and completed in others, and as a result percentages of reactors sent to slaughter vary widely.

INCREASE IN MILK PRODUCTION AND CONSUMPTION

Some persons have held the opinion that the testing and subsequent condemnation of large numbers of dairy animals would adversely affect the milk supply of the country; the facts, however, are to the contrary.

According to census figures the total production of milk increased from 7,805,143,792 gallons in 1919 to 9,198,303,635 gallons in 1924. Again, the per capita consumption of milk in the United States in 1917, as estimated in the Bureau of Agricultural Economics, United States Department of Agriculture, was 42.4 gallons. In 1930 it had risen to 55.3 gallons, which is the latest official estimate available.

The increases in both production and consumption are the result of various causes, and the figures are presented chiefly to show that fears of a reduced milk supply have been entirely groundless.

An even more striking development is evident in the production of creamery butter which, for the entire United States, amounted to approximately 818,000,000 pounds in 1918, 1,496,000,000 pounds in 1927, and 1,597,000,000 in 1929. It is noteworthy, moreover, that nearly three-fourths of the total production and of the increase occurred in 12 North Central States, where tuberculosis eradication has been conducted very actively and extensively. As in the case of milk, various factors are responsible for this growth of the business; the figures are presented merely to show that dairying has made rapid strides while tuberculosis eradication has been in progress.

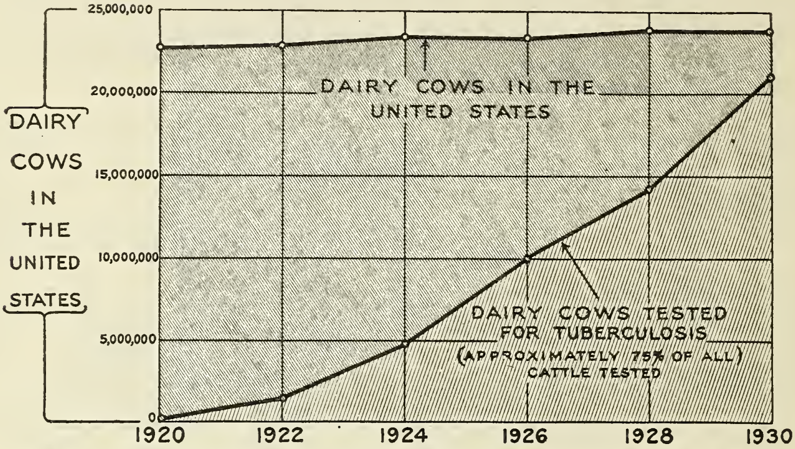

FIGURE 2.—Graphic portrayal of number of dairy cows in the United States and number tested for tuberculosis

NUMBER OF TESTS REQUIRED TO FREE HERDS FROM DISEASE

The number of tests required for practical eradication of the disease from either slightly or heavily infected herds is a matter of practical importance. Such information has a direct bearing on the cost of the work and the time when its benefits may begin to be derived. The question is answered briefly by the data in Table 4, which cover the testing of 24,560 herds containing 571,301 cattle. The tests were applied under typical farm conditions. The extent of infection in the herds ranged from about 10 to 19 per cent of the cattle. Approximately two-thirds of the herds were free from tuberculosis by the second test, 90 per cent by the fourth test, and continued, systematic testing finally resulted in freeing all these badly infected herds from the disease.

TABLE 3.—*Number of tuberculin tests required to free herds of tuberculosis*

Animals tested		Per cent of reactors on—								
Herds	Cattle	First test	Second test	Third test	Fourth test	Fifth test	Sixth test	Seventh test	Eighth test	Ninth test
16, 080	327, 972	12. 2	0. 0							
4, 608	114, 271	18. 0	5. 9	0. 0						
2, 137	61, 965	18. 6	6. 8	4. 1	0. 0					
1, 039	34, 879	18. 0	6. 6	3. 4	3. 1	0. 0				
396	18, 321	17. 0	6. 4	4. 4	3. 3	2. 8	0. 0			
188	7, 980	10. 3	3. 4	3. 9	2. 6	2. 1	2. 1	0. 0		
79	3, 908	11. 9	3. 2	3. 1	2. 8	1. 7	2. 6	1. 8	0. 0	
33	2, 005	18. 9	4. 1	4. 7	3. 5	4. 2	7. 1	1. 9	2. 3	0. 0
24, 560	571, 301									

Table 3 shows that some herds required more tests than others apparently containing about the same degree of infection. It should not be expected, however, that results of tuberculin testing will follow closely any of the examples given. The table is significant principally in showing the value of persistent, continued testing.

HEAVILY INFECTED COUNTY BECOMES MODIFIED ACCREDITED AREA

The effectiveness of thorough tuberculosis-eradication work among cattle is well demonstrated in the activities conducted in Walworth County, Wis. This county is located in the southern part of the State, where tuberculosis among cattle was quite prevalent at the beginning of the campaign, in the early part of 1926. The records of the first complete test of all cattle in that county showed that the disease existed in 28.4 per cent of the cattle. The disease was gradually reduced, as demonstrated on subsequent tuberculin-testing work in the county, and on June 1, 1931, the county was declared a modified accredited area. This is one of the most important dairy counties in the United States, and the results of the area tuberculosis-eradication work in it are very gratifying to livestock owners and others interested in the industry there. During the progress of the work approximately 20,000 cattle reacted to the tuberculin test and were removed from the county. The removal of such a large number of cattle did not reduce the cattle population. In fact due to replacements by purchase and natural increase the cattle population in 1931 was somewhat greater than at the beginning of the work in 1926.

INTERSTATE SHIPMENT OF DAIRY CATTLE

In the course of an eradication campaign, and especially in badly infected centers where many diseased cattle are condemned, it is often necessary to obtain replacement cattle from other States. Buyers have been inclined to seek these replacements from areas known to be relatively free or from those which are conducting intensive campaigns for the complete eradication of the disease. Such purchases have caused a marked increase in the interstate shipment of dairy cattle. This, in turn, has brought about a marked change in the dairy industry, for in those States from which the replacements are drawn, the demands of the buyers for tuberculosis-free cattle have led to the raising of larger numbers of the better types of heifer calves, and also have led the dairy farmer to become an advocate of better breeding. (Fig. 3.)

Many thousands of dairy cows have been moved interstate under the provisions of the Federal regulations in order to supply the needs of dairymen who find it necessary to replace, by purchase, cattle in their herds. The supervision of this traffic in order to prevent the spread of tuberculosis in cattle has been an important factor in connection with the eradication project. During some of the most active years as many as 400,000 cattle have been moved interstate and subjected to the tuberculin test prior to such shipment.

ECONOMY OF THE TUBERCULIN TEST

The results of tuberculin testing presented thus far show the effectiveness of the eradication work. In addition, it has proved to be highly economical, especially when large numbers of cattle are tested, as is the case in area work. The cost of official tuberculin testing, including tuberculin, equipment, salaries, and travel of inspectors, has averaged usually about 25 cents for each animal tested. These costs are paid from public appropriations, the work being done without charge to herd owners. The figures mentioned take into consideration the observation of animals tested by the intradermic method, which necessitates a second visit of the inspector about three days after the injection of tuberculin is made. The figures likewise include administrative and sundry expenses incidental to the work.

FIGURE 3.—A herd of purebred Jersey cattle in Vermont. This herd has been tuberculin tested annually for many years and has remained free from infection. Many cattle are purchased in this region for additions to herds in southern New England

From a purely business standpoint tuberculin testing has been a profitable investment for the livestock industry, since the cost of the test is greatly outweighed by increased value of animals known to be free from tuberculosis. Owners of accredited herds commonly estimate that their animals are worth from $10 to $50 a head more by reason of their known freedom from tuberculosis. The exact figure depends largely on the kind of cattle in question.

CITY ORDINANCES FAVOR MILK FROM TUBERCULIN-TESTED COWS

Though prompted chiefly by public-health considerations, ordinances which require the tuberculin testing of herds contributing to local milk supplies exert powerful financial pressure. Such ordinances act as barriers to the sale of unsafe milk on the one hand,

and increase the demand for milk from tuberculin-tested cows on the other. The trend of civic sentiment in this respect may be seen in Table 4, which gives the results of two surveys with respect to tuberculin-testing ordinances among cities and towns.

TABLE 4.—*Number of cities and towns in the United States requiring the tuberculin test*

Date of survey	Total reported as having ordinance	Type of ordinance	
		Requiring tuberculin test	Requiring tuberculin test or pasteurization
Apr 1, 1926	1, 249	874	375
Dec. 1, 1927	2, 112	1, 557	555

The figures indicate an increase of public sentiment in favor of such safeguards as tuberculin testing and pasteurization. More than 1,500 cities and towns in the United States require that milk sold in such localities shall be from tuberculin-tested cattle, and at least 555 others require either the test or pasteurization of the milk.

Since the last survey was made a number of large cities have adopted ordinances requiring that all cows supplying milk be shown by the tuberculin test to be free from tuberculosis. Philadelphia, Pa., St. Louis, Mo., and Newark, N. J., are some of the largest cities that have adopted such requirements since 1927. Many milk distributors in cities not having such ordinances require that all their patrons furnish milk from cows that have passed the tuberculin test. Recently there seems to be more interest in ordinances requiring that butter be manufactured from cream obtained from cows that have passed the tuberculin test. In fact some of the butter-handling concerns already have such a requirement.

GROWTH OF MODIFIED ACCREDITED AREAS

Soon after the beginning of systematic tuberculosis eradication public officials and livestock owners recognized that the benefits accruing to individual farms would apply likewise to larger areas. In fact, for the protection of tuberculosis-free herds, it became desirable for the other herds in the community to be freed of the disease. This feeling led, in 1923, to the establishment of counties designated as modified accredited areas. The term signifies that all cattle in such areas have been tuberculin tested, that infection of cattle did not exceed one-half of 1 per cent of the total, and that all reactors were removed. Figure 4 shows the steady increase in the number of such counties.

APPRAISAL, INDEMNITY, AND SALVAGE OF ANIMALS

From the cattle-owner's standpoint the official tuberculin testing of his herd has a direct bearing on his personal finances. Whereas the known absence of disease practically always increases the value of animals in the herd, the detection and removal of reactors may be the cause of temporary financial loss. However, the owner's loss, in the average case, is comparatively small as may be seen in Figure 5.

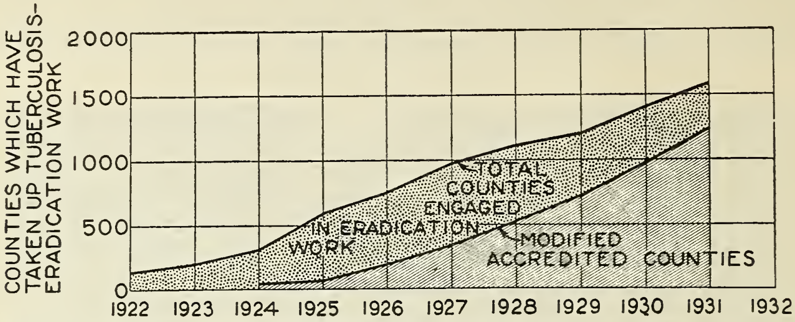

FIGURE 4.—Progress of area tuberculosis eradication, 1922–1931. There are 3,073 counties in the United States

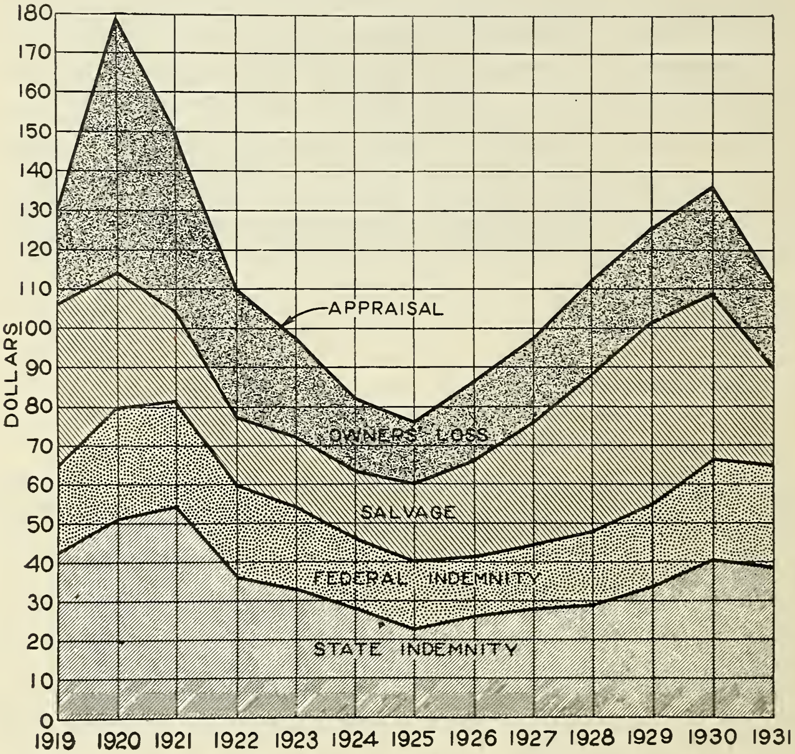

FIGURE 5.—Average appraisal, salvage, and State and Federal indemnities for reactor cattle, 1919–1931

The total amount of Federal and State indemnity plus salvage has averaged fully three-fourths of the appraised value of reactor cattle. Thus the owner's loss is comparatively small, especially when the benefits of having a clean herd are considered, and this loss is seldom an obstacle to the work. In recent years the waiting list for official tuberculin tests has generally represented several million cattle, indicating that there is slight apprehension of financial loss. The funds which the owner receives from the disposal of tuberculous cattle are commonly applied to the purchase of better animals.

PREVALENCE OF TUBERCULOSIS AMONG SWINE

Because pork production in the United States exceeds that of all other kinds of meat combined, the health of swine warrants close consideration. Swine, however, are slaughtered at a much earlier age than cattle, and hence there is less opportunity for diseased swine to show generalized cases or to become spreaders of tuberculosis. Swine are susceptible, however, to the avian as well as the bovine type of tuberculosis. As a consequence they often show infection even when raised in areas that are practically free from the bovine form of the disease. Table 5 gives information concerning the disposition of tuberculous-swine carcasses at federally inspected establishments. The data reveal a surprisingly large degree of infection among swine as evidenced by more than 11 per cent of retentions of carcasses. The percentage of condemnations was less than a tenth as great as the percentage of retentions but nevertheless involved large quantities of pork.

TABLE 5.—*Swine losses resulting from infection by tuberculosis, based on Federal meat-inspection records, fiscal years 1921–1931*

Year	Hogs slaughtered	Carcasses retained because of tuberculosis		Retained carcasses sterilized		Retained carcasses condemned	
	Number	*Number*	*Per cent*	*Number*	*Per cent*	*Number*	*Per cent*
1921	37, 702, 866	4, 693, 305	12. 4	96, 340	2. 1	64, 830	1. 4
1922	39, 416, 439	5, 640, 061	14. 3	95, 809	1. 7	70, 304	1. 2
1923	48, 600, 069	7, 139, 925	14. 7	113, 802	1. 6	88, 688	1. 2
1924	54, 416, 481	8, 293, 965	15. 2	125, 000	1. 5	100, 110	1. 2
1925	48, 459, 608	7, 039, 724	14. 5	106, 328	1. 5	86, 282	1. 2
1926	40, 442, 730	5, 667, 093	14. 0	81, 646	1. 4	63, 748	1. 1
1927	42, 650, 443	5, 778, 009	13. 5	73, 232	1. 3	59, 656	1. 0
1928	48, 347, 393	5, 872, 503	12. 1	69, 756	1. 2	55, 749	. 95
1929	47, 163, 573	5, 408, 910	11. 5	58, 030	1. 1	46, 624	. 86
1930	46, 688, 860	5, 321, 352	11. 4	53, 783	1. 0	42, 381	. 80
1931	44, 020, 633	5, 174, 343	11. 8	49, 549	. 96	38, 805	. 75

From a meat-packing standpoint the presence of tuberculosis in swine also involves a heavy expense by reason of the special handling given to retained carcasses. They must be set aside for more detailed inspection, thereby interfering somewhat with the expeditious handling of the entire kill. The special handling also requires extra space and equipment. The resulting expense, estimated at about $1 a carcass, is an economic load which the livestock industry carries directly or indirectly. The material decrease, since 1924, in the number of retentions and condemnations is encouraging, but the condemnation in 1931 of more than 38,000 hogs represents the loss of more than 5,000,000 pounds of pork and 1,650,000 pounds of lard. Besides this total of 6,650,000 pounds of food products, meat-inspection records indicate that owing to localized infection fully as large a quantity was lost through condemnation of parts of carcasses.

TUBERCULOSIS IN POULTRY

Knowledge of the extent of tuberculosis among domestic poultry is less exact than that of the disease among cattle and swine. Poultry are not subject to the Federal meat inspection law; hence figures comparable to those given for the larger food animals are lacking in their case. Table 6, which is the best present information on the subject, is based on physical examinations of large numbers of flocks in 28 States. The examinations were made by veterinary inspectors, for the most part incidentally to the testing of cattle on the same farms. The map (fig. 6) gives supplementary information showing the estimated distribution of the infection. These data were compiled on the basis of infected flocks; thus far, comprehensive figures on the extent of tuberculosis among the 400,000,000 fowls of the United States are not available.

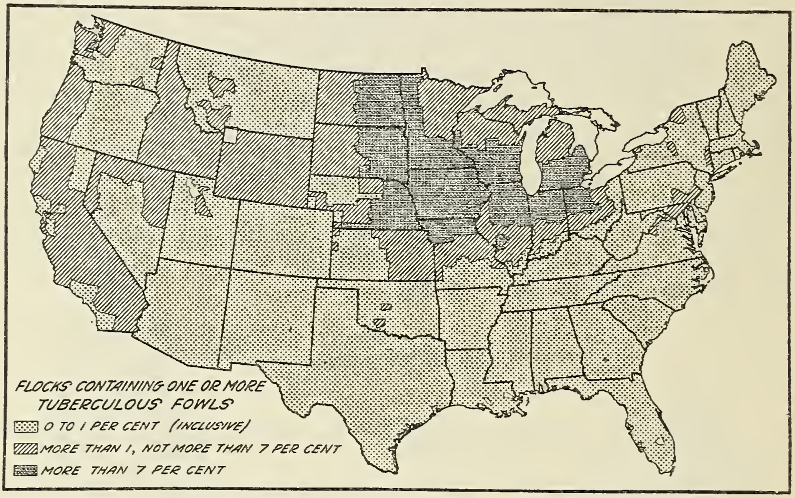
FLOCKS CONTAINING ONE OR MORE TUBERCULOUS FOWLS
░ 0 TO 1 PER CENT (INCLUSIVE)
▨ MORE THAN 1, NOT MORE THAN 7 PER CENT
▦ MORE THAN 7 PER CENT

FIGURE 6.—Estimated extent of tuberculosis among flocks of poultry

TABLE 6.—*Extent of tuberculosis among poultry, 1925 to 1931*

[Based on physical examinations of flocks in 28 States]

Year ended June 30	Flocks			Fowls inspected (estimated)
	Inspected	Found infected with tuberculosis		
	Number	*Number*	*Per cent*	*Number*
1925 (4 months)	75, 799	4, 690	6. 2	5, 107, 600
1926	157, 950	9, 751	6. 2	14, 012, 900
1927	211, 675	11, 991	5. 7	16, 502, 800
1928	226, 104	15, 787	7. 0	20, 411, 000
1929	165, 239	10, 659	6. 4	16, 763, 700
1930	177, 156	11, 779	6. 6	18, 931, 400
1931	186, 966	9, 347	5. 0	21, 174, 700
Total	1, 200, 889	74, 004	6. 2	112, 904, 100

REPORTS OF STOCK OWNERS AND PUBLIC OFFICIALS

The information on the preceding pages is from official sources and gives a substantial basis from which to judge the progress and current status of tuberculosis-eradication work. It may be considered direct evidence, and it deals with the subject from a national point of view. But since the farm is a convenient unit of livestock production, it is desirable to supplement the figures given with the comments of persons who have had intimate contact with tuberculosis eradication on their own farms or in their respective localities. Those here presented were selected either because they were typical of scores of others or because of the sidelights which they throw on the different economic phases of the tuberculosis-eradication work. Experiences of the kind reported are interesting and valuable in that they show the current attitude of livestock owners and others toward tuberculosis-eradication work. Most of the comments were received in 1928 and 1930. In some instances veterinary inspectors also have reported observations incidental to their principal work of testing.

INCREASED VALUE AND SALABILITY OF CATTLE

TUBERCULIN-TESTED CATTLE BRING $26 MORE A HEAD

A report of two farm sales, held in Wisconsin, within half a mile of each other on the same day, affords an interesting comparison of values of tuberculosis-free cattle and of untested cattle. James Lacey, county agent of Green Lake County, Wis., furnished the comparative figures. The two farms were on opposite sides of the Green Lake-Dodge County line. The animals in Green Lake County were tested, while those on the farm in Dodge County were not. The Green Lake County cattle averaged $26 a head more. Aside from the test having been applied to one herd and not to the other there was no noticeable difference in quality. Lacey stated:

> The eradication campaign has been the biggest project attempted in this county in my 10 years' experience. Furthermore, this project with its magnitude has caused less dissatisfaction than any other attempted. Our farmers believe in the test and they have "sold" the idea to adjoining counties.

$10 TO $50 INCREASE IN CATTLE VALUES

The benefits (fig. 7) derived by stock owners in areas under Federal and State supervision in Michigan are summarized by the bureau's inspector in charge at Lansing. He states:

> They are first an increase in the sale value of cattle, following the first successful tuberculin test of a herd, amounting to from $10 to $50 a head, and, second, an open market for milk in either Chicago or Detroit, as well as in the smaller cities and villages.

CREATED DEMAND FOR 50 CARLOADS OF CATTLE

The effect of tuberculin testing on the demand for cattle in Josephine County, Oreg., is related by the county agent, H. B. Howell. He states:

> Prior to the time our county was placed on the accredited list, the sale of cattle to outside buyers was almost unknown. But shortly after accreditation,

California buyers began to come into this territory and in the last two years we have shipped out some 50 carloads of dairy cattle for which I estimate buyers have paid between $75,000 and $100,000. They are always anxious to know whether the cattle have been tested, and I estimate that they pay from $10 to $15 a head more for tested cattle than they would otherwise. (Fig. 8.)

BUYER REFUSES TO PURCHASE CATTLE FROM TUBERCULOUS HERD

A report from the bureau's inspector in charge in Colorado cites the case of a cattle buyer who was seeking a number of dairy cows in a vicinity where area work to eradicate tuberculosis had begun. He had about closed a deal for an entire herd, the report stated, when he learned that they were outside the tested area. He then made inquiry from authoritative sources and found that some cattle sold for beef from the herd had been condemned for tuberculosis. The buyer refused to purchase any of the herd.

FIGURE 7.—Part of a herd of Shorthorn cattle in Hillsdale County, Mich., recognized as a modified accredited area since 1923. A large number of cattle have been sold from the county

UNTESTED CATTLE UNSALABLE

A Virginia dealer who ships from 1,000 to 1,400 cows and heifers every year, reports:

> I can not sell a carload of cows that is not tuberculin tested, at any price. Cows from accredited herds of good standing are not only in demand but will easily bring $25 more a head than cows that have not been under Federal supervision.

That similar public sentiment prevails in many other parts of the country is indicated by numerous reports. In the vicinity of Orange City, Iowa, according to George Dunlop, county agent, " farmers who held public sales last fall and winter found it necessary to offer tested cattle in order to have neighbors bid on them. It has been impossible," he adds, "to sell milk in the towns unless cattle were tuberculin tested."

LOST SALE OF 35 CATTLE

The manner in which a dairy community in Wisconsin lost the sale of 35 cattle is related by one of the dairymen who was also the secretary of the local breeders' association. He said:

> We had buyers here from New Jersey, and they had bought 81 head of cattle. But owing to the laws of New Jersey requiring that cattle come from accredited herds, those in process of accreditation, or from modified accredited areas, we were able to make shipment of but 46 head. This inability to ship the remaining 35 head was bad for the buyers, the sellers, and for me, the secretary of the association.

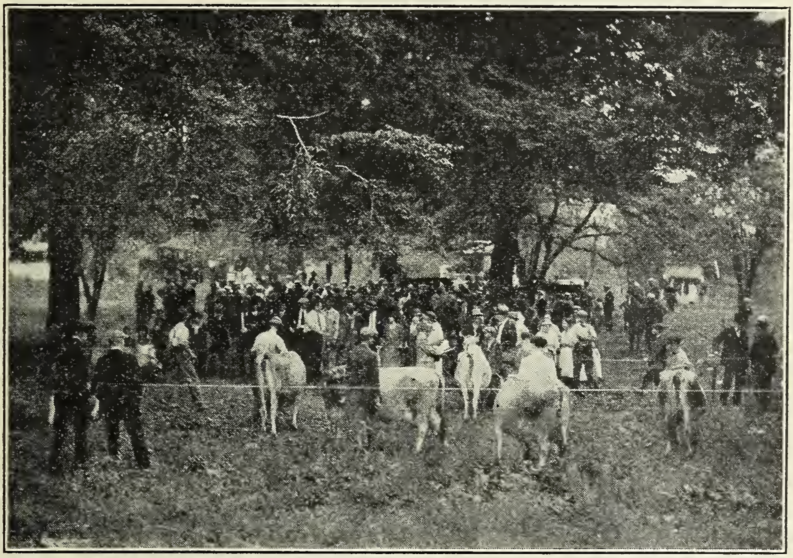

FIGURE 8.—Exhibition and sale of purebred dairy cattle in modified accredited county

DAIRY CATTLE WORTH A THIRD MORE

The bureau's inspector in charge of tuberculosis eradication in California stated, in a recent report:

> The value of dairy cattle in Tehama County has increased at least 33 per cent since the work was begun, and the number of dairy cattle has increased fully 50 per cent. Accredited-herd owners report that the value of their animals has increased more than half, and in some instances the value of cattle has more than doubled. One owner informs me that before the herd was tested for tuberculosis he sold cows at an average price of $55 a head. The first year his herd was declared clean they averaged $75, while the year following the average sale price was $125. He attributes this increase in value to the good records of his herd for production and health.

23,000 CATTLE WORTH $10 A HEAD MORE

In Cache County, Utah, which became a modified accredited area in 1925, there are approximately 23,000 head of dairy cattle. Speaking at a livestock meeting, a prominent resident estimated that, among many other benefits, the work had increased the valuation of cattle at least $10 a head. At the same time, he stated, it offers a more ready market for surplus stock.

CATTLE PRICES INCREASE 25 PER CENT

The bureau's inspector in charge in Maine reports an increase of approximately 25 per cent in the value of cattle according to sales observed. "Before accredited-herd and intensive area work was begun," he stated, "buyers did not care whether the cattle were tested or not. Now they ask that as the first question."

ERADICATION WORK INCREASES VALUE OF CATTLE

Substantial dividends from tuberculosis eradication in his county are reported by C. L. Bolander, county agent, Howell, Mich., who states:

> The eradication work has greatly increased the value of cattle in the county. Since it became accredited we have shipped not less than 100 carloads of cattle a year, and the price has averaged from $15 to $25 more per cow than for unaccredited cattle.

BOARDER COWS BRING BETTER PRICES

A Connecticut dairyman reports, "Since having a tuberculosis-free herd I get from $15 to $20 apiece more for boarder cows which it is necessary to sell for beef." These are dairy cows whose milk production is not sufficient to yield a reasonable profit above the cost of feed.

GREATER PRODUCTIVITY OF HERDS

INCREASE OF 1,586 POUNDS OF MILK PER COW

In a public address in 1929, I. W. Heaps, secretary of the Maryland State Dairymen's Association, stated:

> I feel sure that our farmers to-day are convinced that it has been profitable to clean up—that it is not profitable to keep unclean herds. A diseased cow is not a profitable cow. It will break down sooner or later.

Referring to milk production before and after systematic tuberculin testing, he added:

> Our actual figure on production per cow in 1924 was 5,246 pounds. In 1928 we find an increase of 1,586 pounds per cow. The cows produced $51.38 per head more than in 1924, and brought $2,500,000 more to the producers.

RETURNS FROM SALE OF MILK AND CATTLE SHOW GAIN EXCEEDING $500,000

A dairy-achievement day was held during June, 1929, in Rock County, Wis., to celebrate the successful eradication of bovine tuberculosis from the county. Exhibits, addresses, and entertainment features formed a diversified program. According to a report by James S. Healy, the Federal inspector in charge of tuberculosis eradication in Wisconsin, the occasion exemplified the manner in which the suppression of tuberculosis is related to other constructive agricultural measures.

A comparison of returns received for dairy products and cattle, before the tuberculin-testing campaign and afterwards, revealed that producers in this highly developed dairy county have lately been receiving annually for milk and surplus cattle over half a million dollars more than in 1925, before the area test. This gain has been achieved in spite of the condemnation and slaughter, as reactors, of more than 8,000 cattle. Tuberculous infection in Rock County exceeded 14 per cent of the cattle at the time of the first test, and the reduction of such infection to less than one-half of 1 per cent in 1929 is regarded as an achievement that should encourage seriously infected counties to undertake similar work.

After the condemnation of the reactor cattle, restocking proceeded, and dairymen observed with satisfaction an increase of about 20 per cent in milk production the first year, although milking fewer cows. In 1929 milk production in the county was about 50 per cent greater than in 1925, before the area test.

FORTY-FOUR REACTORS REMOVED—HERD PRODUCTION GREATER

A case in which even a badly infected dairy herd was freed of the disease with benefit to its production is reported by the bureau's inspector in charge in Louisiana. A 48-cow dairy in the vicinity of New Orleans had 44 reactors, following an official test. The inspector stated:

> This owner replaced the reactors with 20 head of dairy cattle that had passed the tuberculin test and as a result obtained more milk from his dairy than he had previously had from the 48 head. Furthermore, he was able to raise healthy calves, whereas under former conditions, most of his calves had died.

LOST ENTIRE HERD AND PROSPERED

An experience dating back eight years is related by a dairyman living near Clinton, Wis. He stated:

> In 1921 I applied for an accredited-herd test and lost my entire herd of 33 cattle. The average return on this herd was $65, and while I may have lost some money on the test, I lost more each year before I tested than I did from the test. I restocked with 18 head of grade cattle and had some money left from my salvage and indemnity. The new herd went to work and the 18 clean cows gave more milk than the infected herd did the year before.

HEALTHY COWS HAVE LONGER PRODUCTION PERIOD

A California dairyman estimates that the production of a herd free from tuberculosis is, at a conservative figure, 10 per cent greater than that of a diseased herd. "In addition to this," he states, "the producing life of a cow in a clean herd is considerably longer." Reviewing an experience before the herd was freed of tuberculosis, he said:

> We weeded out in November, 1927, all cows which were giving less than 280 pounds of butterfat production a year. By March, 1928, almost one-third of the remaining animals in the tuberculous herd had broken down in production and had to be weeded out on that account. Such a heavy default in production would not have occurred in a herd of similar age had the animals not been called upon to bear the burden of disease and heavy milk

production at the same time. I am satisfied that the average profitable productiveness of cows in a clean herd is at least two years longer than that of those in a tuberculous herd.

A SICK COW CAN NOT WORK

Pointing out that " a sick cow can not work and make any profit for a farmer," a Wisconsin dairyman tells briefly how he discovered tuberculosis in his herd:

> I first suspected that my cattle were tuberculous when the buyer for a sausage factory refused to buy my hogs, stating that too many had been tuberculous when the inspection was made. He told me that my cows might have tuberculosis and described how they would look on the inside. I looked at the next one that died and found what he said would be there. I know it pays to have tested cows for I lost money every year my cows were sick.

LOSS CAUSED BY DEFERRED TESTING

A costly result of postponing tuberculin testing is contained in a report from Vermont. A case occurred in Brownsville, the report states, in which the entire herd of 46 animals reacted, and the carcasses of 5 were condemned entirely on post-mortem. This herd had been a fine-producing herd. Two years before, after signing a tuberculin-test agreement, the owner decided not to submit his animals to the test, since his milk checks were of such amount that he could not take a chance at that time. Later his herd dropped off materially in production. Several animals died, and though they were replaced with good individuals the dairyman could not keep up production and submitted his herd to the test. Some of the animals which he had sold to the butcher had shown tuberculosis to such an extent that the butcher refused to pay for them.

MORE MILK PER COW—A DEALER'S VIEW

Experience and observations similar to those just reported have been noted likewise by milk dealers whose books show milk receipts from a large territory. One of the largest milk distributors of Chicago reports that more milk was produced per cow during the first year after the Chicago ordinance requiring tuberculin testing went into effect than in any previous year in the history of the company. The ordinance was responsible for the testing of the thousands of cows contributing to Chicago's milk supply.

BETTER HERD MANAGEMENT

Scores of observations similar to the foregoing are summed up in a statement by H. W. Norton, jr., who as director of the Michigan Bureau of Animal Industry made a thorough study of the effect of the removal of reactors on milk production. His conclusions show that in every county a wave of herd improvement followed tuberculin testing. Thus, better herd management, when combined with the replacement of tuberculous animals by better cows, is the explanation of the marked increase in milk production.

BETTER MARKETS FOR LIVESTOCK PRODUCTS

TEST BROADENS OUTLET

Public sentiment concerning the results of tuberculosis eradication in Iowa was obtained through a questionnaire sent by the editor of the Iowa Homestead to 1,000 breeders. Of these, 510 answered most of the questions, which is a larger percentage of replies than is ordinarily received to such inquiries. In answer to the question "Has the test broadened the outlet or increased the price of livestock products on your farm?" 488 replies were affirmative, and 2 were negative.

Another question asked whether the cattle owners who had clean, tested herds would exchange them for the herds they had prior to the test if the owners were reimbursed for the trouble of testing and for losses from reactor cattle. Answers to this inquiry showed general satisfaction with the test. No one was willing to have his original diseased herd back again.

DAIRYMEN OWNING TUBERCULOSIS-FREE STOCK RECEIVE PREFERENCE

The superintendent of field service for a large milk company in California reported that dairymen who have clean herds are almost always given preference for market-milk contracts. Dairymen who are able to obtain such contracts receive a price for their whole milk equivalent to approximately 88 cents per pound of butterfat, whereas those dairymen who can not get a market-milk contract must be content with a price of from 48 to 58 cents a pound of butterfat. The added cost of producing butterfat in market milk is not more than 12 cents a pound, from which it is readily seen that the dairymen's profit by reason of the preference is from 15 to 25 cents per pound of butterfat produced.

NEW MILK PLANT REDUCES HAULING COSTS

Besides receiving better prices, owners of tuberculosis-free herds have derived other benefits, such as closer markets, resulting from the establishment of new industries in the community.

The manager of a plant recently established in Shelbyville, Ind., where powdered milk is prepared, stated that the erection of the plant depended first on whether the citizens were sufficiently interested to obtain the appropriation required to insure a complete tuberculin test of the cattle in the county. The establishment of this local market for milk is responsible for an estimated saving of at least $2,000 a year on hauling charges alone, and the price of dairy cows has increased approximately $20 a head.

A similar instance is reported from the Buckeye State, as follows: Shortly after Henry County, Ohio, was declared to be a modified accredited area, in December, 1925, a milk-receiving plant was built at Holgate, Ohio, at a cost of approximately $100,000, the milk being shipped to Chicago. During the first 19 months of operation, milk producers of the locality are reported to have received over $1,500,000. The tuberculin testing of dairy cattle in the county is credited with being directly responsible for stimulating the dairy industry and providing a permanent and satisfactory market for milk.

BANK DEPOSITS INCREASED 20 PER CENT

Information furnished by the bureau's inspector at Nashville, Tenn., also points to direct financial benefits from systematic tuberculosis work in that State. He states:

> The fact that Marshall County is an accredited area is a factor responsible for attracting companies to establish condensaries, cheese factories, and powdered-milk plants in Marshall and adjoining counties, thus greatly stimulating interest in dairying in the State. Developments have shown an improved condition among dairy producers of Tennessee. One bank official states that the deposits in his institution increased 20 per cent during the first year's operation of the condensary in the county. Owing to increased values of from $15 to $25 a head for cattle, persons in close contact with conditions in Marshall County estimate that cattle owners have benefited to the extent of from $200,000 to $250,000 as a result of the county's modified accredited status.

INCREASED CONSUMPTION OF MILK

That increased milk consumption is apparently a direct consequence of tuberculin testing is reported by the health officer of Chicago, Ill. Several years ago when the ordinance providing that milk for sale in that city must be from tuberculin-tested cows became effective it attracted much publicity. Following the first year's enforcement of the tuberculin-test regulation the health officer reported an increase of 15 per cent in the quantity of milk consumed in Chicago.

TUBERCULOSIS OF SWINE

TUBERCULIN TESTING OF CATTLE AFFECTS MARKET OUTLET FOR SWINE

The far-reaching effect of diseased conditions in livestock is illustrated by an experience reported by the secretary of the Sioux City (Iowa) Livestock Exchange. He states:

> One of the first impressions I received of the cost of tuberculosis dates back about 25 years when a packer-buyer on our market paid a premium over other bidders in order that he might ship a certain load of fancy heavy hogs to an eastern packer. The packer, however, reported that 60 per cent had been "cut down" for tuberculosis and asked him to investigate the origin of the hogs so that suit might be brought against the shipper to recover part of the loss if they could find that the shipper had any knowledge of the condition of the hogs.

Other eastern packers learning of the diseased shipment later took their orders off the market and for years bought no hogs in Sioux City. The secretary of the exchange said further:

> Our experience has shown that financially every livestock producer who contributed to the Sioux City market suffered. We are proud to say that through the tuberculosis work of the last six years the packers who left us years ago have again become patrons of the market as a result of the showing we were able to make to them of the progress in cleaning up the disease.

It may be added that a high percentage of disease in certain lots of hogs may cause a market to acquire a reputation which it does not fully deserve, yet because such cases are reported by one buyer to another there develop a reluctance and fear to make further purchases.

PREMIUMS PAID FOR SWINE FROM MODIFIED ACCREDITED AREAS

When tuberculosis eradication on an area basis was begun many packers offered a premium of 10 cents a hundredweight for swine from modified accredited areas. This money was paid without restriction until July 1, 1928, on the basis of certificates from officials of the respective counties stating that the swine were bred and raised within those areas. This payment of a bonus was strictly a business matter, prompted by the desire of packers to obtain healthy hogs. Beginning July 1, 1928, the packing industry required that before further premiums were paid the swine must be tattooed in order that any infection found might be traced to the proper owner. This basis for payment continued until May 1, 1929, when the payment was further restricted to those hogs bearing legible tattoo marks and found by Government inspection to be free of tuberculosis. On June 1, 1930, the packers discontinued the payment of all such premiums.

TUBERCULOSIS OF FOWLS

LOSSES CAUSED BY AVIAN TUBERCULOSIS

Reports from 28 States show that avian tuberculosis causes losses of three general classes, namely, reduced egg production, deaths of poultry, and general unthriftiness. The States furnishing such information are located principally in the area known to be rather heavily infested with avian tuberculosis.

The bureau's inspector in charge in Iowa furnishes a summary of losses in poultry flocks based on reports from veterinarians, the essential results being as follows:

	Per cent
Average loss in egg production	10
Average loss in deaths	9
Average loss from unthriftiness	17

CONSERVATION AND IMPROVED AGRICULTURE

The value of livestock health as an economic influence in successful agriculture is commonly recognized, but there is a tendency to think of this influence as remote or at least indirect. An impressive statement on this question by the president of the Institute of American Meat Packers shows how an official of the meat industry regards the suppression of tuberculosis. He states:

> The agriculture of the United States is peculiarly one of livestock. for the reason that a very definite percentage of all the grain produced is marketed by feeding it to livestock. Since successful agriculture is so essential to the prosperity of the Nation, it is necessary that our attention be directed to the conservation of our livestock.

Referring to meat-inspection figures, he spoke of the large loss of meat through condemnations because of tuberculosis. " Using as a basis the per capita consumption of 154.3 pounds of meat per annum," he continued, " and also that five persons constitute the average American family, the amount of meat lost is equal to a supply sufficient to provide the meat diet for 36,063 American families."

Greater economic stability and more diversified and profitable types of agriculture are cited as results of systematic tuberculosis eradication.

CAUSED MORE DIVERSIFIED AGRICULTURE

The manner in which the tuberculin testing of cattle in Henry County, Ohio, has influenced the type of agriculture is related by the bureau's inspector in charge of the work in that State. He states:

> Although the county was placed on the modified accredited list in December, 1925, farmers were interested largely in grain farming until the Chicago milk ordinance limiting the supply to the milk of tuberculosis-free herds went into effect. They seized the opportunity of a ready market for their milk because their herds qualified. The tuberculin test in Henry County has been directly responsible for a more diversified agriculture. This brings about a more steady income and assures against losses through crop failures.

CONCLUSIONS AND SUMMARY

The economic benefits of tuberculosis eradication, presented briefly in the foregoing pages, may be summarized further as follows:

The systematic campaign to eradicate tuberculosis from livestock has an important practical bearing on the value of animals, their salability, and on profitable outlets for livestock and dairy products.

Although an insidious disease of high morbidity, tuberculosis can be entirely eradicated from individual premises and from large areas by systematic tuberculin testing. Even extensive infection can be eradicated by repeated tests and the removal of reactors.

The extent of tuberculosis among cattle has been materially reduced during the progress of the eradication as evidenced by both meat-inspection records and official surveys. The results of surveys since 1922 indicate a reduction of about 50 per cent in tuberculosis among cattle throughout the country.

The total quantity of beef condemned by Federal inspectors because of tuberculosis averaged over 20.000,000 pounds annually in recent years, but this loss has now decreased to about half that quantity.

The campaign to eradicate tuberculosis, including the removal and slaughter of more than 2.000,000 reactors, has had no adverse effect on the milk supply of the United States. On the contrary, total production and per capita consumption of milk have increased materially.

The interstate shipment of cattle from tuberculosis-free areas has become an extensive business, in some years being as high as 400,000 head, intended principally for dairy and breeding purposes.

Tuberculin testing, especially when large numbers of cattle are involved, is inexpensive, the cost being repaid many times by subsequent economic benefits.

The number of cities and towns that require their milk supplies to come from tuberculin-tested cattle exceeds 1,500.

City milk ordinances containing tuberculin-test requirements bar the sale of unsafe milk and increase the demand for the product of tuberculin-tested cows.

The number of counties classed as modified accredited areas has been increasing steadily, with prospects for further increase.

Records of amounts which owners of tuberculous cattle receive for condemned animals, including salvage, Federal indemnity, and State indemnity, show that the owner's loss is usually less than a fourth of the animal's appraised value. This loss is soon retrieved in the form of better prices for livestock and their products.

Cattle owners report that breeding stock from tuberculosis-free herds sell more readily and at better prices than similar animals from untested herds. Increases in value fluctuate considerably, the usual increased value ranging between $10 and $50 a head. In some localities untested cattle are practically unsalable.

There is close agreement in the estimate of the increased value of tested cattle in reports received from livestock owners, county agents, veterinary inspectors, cattle buyers, and others closely in touch with cattle values.

The milk production of dairy herds from which tuberculous cattle are removed generally increases, owing to the replacement of reactors with better cattle and through increased attention to health, sanitation, and herd management.

The postponement of tuberculin testing generally causes losses greater than the income obtained from cattle that prove later to be tuberculous.

Approximately 12 per cent of the swine slaughtered under Federal inspection show some evidence of tuberculosis, though the lesions are usually small. Though less than 1 per cent of the carcasses of affected swine are condemned, the total present loss is approximately 13,000,000 pounds of pork products annually.

Tuberculosis of poultry is the cause of serious economic loss in the form of reduced egg production, unthriftiness of fowls, and their death. Data from 28 States indicate that about 6 per cent of poultry flocks are infected to some extent by tuberculosis.

Tuberculin testing tends to broaden the outlet for livestock products from a farm, often resulting in new local industries and a saving in hauling and other marketing costs.

Since livestock serves as the principal balance wheel in the agriculture of the United States by consuming a large proportion of our crop and forage resources, the health of such livestock is essential to our highest agricultural prosperity.

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